



DEPARTMENT OF HEALTH AND SOCIAL SECURITY
AND THE WELSH OFFICE

Memorandum on Rabies

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FOREWORD

This Memorandum, which is prepared for the information of the medical profession, generally reflects the growing public awareness regarding rabies; it draws attention to the risk to travellers going to enzootic areas abroad and to the increased risk in Europe as a result of the spread of the disease there. Advice to travellers is included, as well as advice on pre-exposure vaccination for occupational groups at risk and on the treatment of bites and of human rabies. Information is provided about the use of the new human diploid cell vaccine for pre-exposure and post-exposure use. This Memorandum also contains, for easy reference, the Memorandum on Rabies in Animals prepared by the Ministry of Agriculture, Fisheries and Food (see Appendix V) and refers to the part Medical Officers for Environmental Health would play in the control of indigenous rabies should the need arise.

An earlier draft of the Memorandum was circulated in August 1976 to those doctors likely to be involved in rabies contingency planning. The contents of this edition have been revised in the light of comments received from them and on the advice of numerous experts and interested bodies who have been consulted on different aspects of the disease. We should like to express our thanks to all those who have helped in its preparation.

H. YELLOWLEES, K.C.B., F.R.C.P., F.F.C.M.
Chief Medical Officer
Department of Health and Social Security

R. BEVAN, M.D., D.P.H., F.R.C.P., F.F.C.M.
Chief Medical Officer
Welsh Office

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MEMORANDUM ON RABIES

Introduction

1. This Memorandum reviews and updates, in the light of recommendations by the WHO Expert Committee on Rabies (1973)⁽¹⁾, previous advice on the prophylaxis of rabies in man issued in the Monthly Bulletin of the Ministry of Health and the Public Health Laboratory Service in 1967. It draws attention to the developing rabies situation in Europe, new vaccines, and the recent addition of rabies to the list of notifiable diseases in England and Wales. The Memorandum includes advice on pre-exposure prophylaxis and post-exposure treatment, on the precautions to be taken when nursing a case of human rabies and on action to be taken by Medical Officers for Environmental Health following notification of a case of rabies. A recent Memorandum on Rabies issued by the Ministry of Agriculture, Fisheries and Food is reproduced at Appendix V.

Human rabies in England and Wales

2. No case of indigenous human rabies has been reported in England and Wales since 1902 but, from time to time, individual instances of imported rabies do occur in persons who become ill after infection by rabid animals abroad. Such instances are, however, rare: in all there have been 12 cases of imported rabies in humans since 1946.

Rabies in Europe

3. Rabies occurs in all continents except Australasia and Antarctica. This wild life epizootic* which has spread throughout a great part of Central and Western Europe during the last 30 years continues to advance from NE France in a westerly and south-westerly direction. Over 5,000 cases of rabies in animals were reported in France and the Federal Republic of Germany in 1973 and 7,750 cases in 1975. In 1976 this had risen to a total of 11,552 cases of rabies in animals in France and West Germany. It has been conservatively estimated that, at the current rate, the disease will be nearing the Channel coast by 1980. The disease has also appeared in Belgium and Holland, but in the latter country is confined to foxes in the eastern area. In Belgium, however, it is more widespread and involved 465 cases in a number of species in 1976. The red fox is the main reservoir and vector of the disease in Western Europe but it infects other contact species, both wild and domestic. Human deaths have been few but many thousands of individuals undergo post-exposure treatment each year (see paragraph 7).

Because of the westward spread of the disease on the Continent there has been growing concern at the increased risk of rabies being reintroduced into this country either through the smuggling of animals from enzootic* areas or by the escape of a rabid animal from a ship or an aircraft.

The increase in the extent of the enzootic area on the Continent has meant that a larger number of travellers from this country are potentially exposed to infection, and anxiety about this has been reflected in an increasing number of requests for medical advice from returning travellers with a history of exposure to animals while abroad. There has been a corresponding increase in post-exposure vaccinations.

*The terms enzootic and epizootic are applied to disease in the animal population in the same way that the terms endemic and epidemic are applied to disease in man.

Rabies in Animals

4. While all mammals are believed to be susceptible, spread within an animal population depends very much on the virus becoming established in certain lead species. In Europe this is primarily the fox.

Rabies virus is present in the salivary secretions of rabid animals which transmit the infection through bites and scratches, or even through licking abraded skin surfaces or mucous membranes. There is frequently a period of days between the appearance of virus in the saliva and the development of overt signs of disease. This is usually a few days in domestic animals but longer in wild animals.

The incubation period of rabies in dogs can be as short as 15 to 19 days, but normally it is rather longer, though only in exceptional cases has it been known to exceed six months. The saliva of the dog may be infectious for three to five days (exceptionally up to two weeks) before frank clinical signs appear, and remain infectious until the dog dies, usually within a week of onset of illness (exceptionally up to three weeks). The classical signs of the disease in the dog include changes in behaviour such as unprovoked aggression, excitability, viciousness, excessive salivation and a tendency to bite, followed by progressive paralysis. Normally, animals with rabies deteriorate progressively after the first signs until death supervenes usually in four to eight days (see also Appendix V).

In many countries cats are, after the dog, the second major source of rabies infection for man⁽²⁾. The incubation period and route of transmission of infection to man are similar to those for the dog, though a cat bite, which is usually deeper than a dog bite, is more likely to transmit infection.

Cattle are highly susceptible to rabies (see Table 1 below). Although not likely to transmit infection by bites, they become a high exposure risk due to the copious salivation and the extra difficulties associated with handling them.

TABLE 1 ANIMAL SUSCEPTIBILITY TO RABIES INFECTION (1)

Susceptibility: Based unless otherwise indicated on the intramuscularly inoculated dose required to infect at least 50% of the animals			
Extremely High	High	Moderate	Low
Foxes	Hamsters	Dogs	Opossums
Coyotes	Skunks	Sheep,* goats,* and horses*	
Jackals* and wolves*	Raccoons	Nonhuman primates	
Kangaroo rats	Domestic cats		
Cotton rats	Bats		
Common field voles	Bobcats		
	Mongoose* and Viverridae*		
	Guineapigs		
	Other rodents		
	Rabbits		
	Cattle		

*Epidemiological evidence only.

Diagnosis in animals

5. Where there is a reasonable suspicion of rabies in an animal which has bitten or scratched a person consideration will be given to destroying the animal and submitting its brain to the Central Veterinary Laboratory at Weybridge for diagnostic examination. Where there is no human involvement the animal concerned is isolated in secure accommodation. A dog or cat may be detained for up to 15 days* during which time it is inspected regularly by a veterinary surgeon. If it survives this period in reasonable health rabies is eliminated as a diagnosis. If it dies the brain is submitted for diagnostic examination.

The result of the fluorescent antibody test (FAT) should be available within 24 hours of the receipt of the head. Histological diagnosis takes longer and would be reported two working days after receipt of the head. The third method of diagnosis used is the biological test: the intracerebral injection of mice with a suspension of suspect brain tissue. Usually a positive result declares itself in about 10 to 14 days, but one must wait at least three weeks to be sure of a negative diagnosis.

Notification of rabies or suspected rabies in an animal

6. Article 4 of the Rabies (Control) Order 1974, made under the Rabies Act 1974, states that "a person who knows or suspects that an animal is affected with rabies, or was at the time of its death so affected, shall with all practicable speed give notice of the fact to an inspector† or to a police constable".

Rabies in Man

7. Cases of human rabies are relatively rare in countries with ready access to post-exposure vaccination and wound treatment. The last WHO World Survey of Rabies XVI (1974) indicated that in Europe alone some 48,000 persons were given prophylactic treatment during that year; 21 deaths from rabies were recorded during the same period.

A person is exposed to rabies when he comes into physical contact with live rabies virus. However, not all exposures lead to infection and there is some evidence to suggest that not all those infected develop the disease. Indeed man is not highly susceptible to the disease⁽³⁾.

8. Although an animal bite with virus-laden saliva is the usual mode of infection in man, transmission of the virus can also occur through mucous membranes though not, as far as is known, through intact skin. Airborne transmission of infection occurred in two men who inhaled a virus aerosol generated in caves inhabited by rabid bats and in a laboratory worker who became infected while rabid sheep brains were being ground for vaccine production⁽⁴⁾. *Person to person* spread of the disease is extremely rare, though there may be a slight risk from intimate contact.

*On occasion the period of detention following a bite incident may be reduced to 10 days where the animal continues healthy and is behaving normally.

†"Inspector" means a person appointed to be an inspector for the purposes of the Diseases of Animals Act by the Minister of Agriculture, Fisheries and Food or by a local authority, and, when used in relation to an inspector of the Ministry of Agriculture, Fisheries and Food, includes a veterinary inspector.

Incubation period

9. The incubation period of the disease in man is generally two to eight weeks but may range between nine days and two years or more. The period tends to be shorter with bites on the face and neck than on the legs. Incubation also tends to be shorter in children than in adults and is longer following bites from wild animals than with bites from dogs and cats.

Clinical features

10. The onset is insidious. Early prodromal symptoms are non-specific except for paraesthesiae in the bitten area and an abnormal sensation radiating proximally from the site of the bite wound. Fever, headache, nausea and a sense of apprehension have also been described. The disease may develop in one of two forms. In one, the manifestations include hydrophobia, intermittent episodes of excitement, hallucinations, maniacal behaviour and, rarely, focal neurological abnormalities. Paralysis and coma supervene after a few days. In the other, the disease presents with signs of an ascending flaccid paralysis with sphincter involvement and sensory disturbances⁽⁵⁾. Death results from respiratory and bulbar paralysis.

Differential diagnosis

11. The disease has to be differentiated from tetanus, hysteria, bulbar poliomyelitis, post-vaccinal encephalomyelitis and from other causes of ascending paralysis.

Laboratory diagnosis

12. The diagnosis may be confirmed by :

- (a) the demonstration of rabies antigen in corneal smears and skin biopsy material;
- (b) the isolation of rabies virus from specimens of saliva, CSF and other secretions. After about the 10th day of illness the virus may be difficult to isolate owing presumably to the development of neutralising antibody. Isolation of rabies virus by mouse inoculation takes at least seven days. Specimens for virological and antibody testing should be sent to the Virus Reference Laboratory, Central Public Health Laboratory, Colindale.* In each case enquiries should be made of the laboratory as regards what specimens are required and how they should be transported;
- (c) after death, virological and histological examination of brain tissue.

*Tel. No.: 01-205 7041.

Prevention of Rabies in Man

Pre-exposure vaccination

13. Pre-exposure vaccination is a recognised precaution for persons at special risk of contracting rabies and, in particular, should be offered to those who are employed:

- (a) at kennels and catteries approved by the Ministry of Agriculture, Fisheries and Food for the quarantine of imported dogs, cats, etc.;
- (b) at quarantine premises in zoological establishments;
- (c) by carrying agents authorised to carry imported dogs, cats, etc.;
- (d) at approved research and acclimatisation centres where primates and other imported mammals are housed;
- (e) in laboratories handling rabies virus;
- (f) at seaports and airports where they are likely to come into contact with imported animals or animals on ships or aircraft, e.g. Customs and Excise and police officers;
- (g) as veterinary and technical staff of MAFF;
- (h) as inspectors appointed by local authorities under the Diseases of Animals Act or employed otherwise who, by reason of their employment, encounter enhanced risk⁽⁶⁾.

Rabies vaccine for pre-exposure use

14. The rabies vaccine recommended for pre-exposure use is *human diploid cell vaccine* (see Appendix I for dosage schedules). This is an inactivated vaccine prepared in human diploid cell culture. It is now manufactured in France and has been licensed for pre-exposure prophylactic use in this country. Trials indicate that the vaccine gives a strong antigenic stimulus.

This vaccine is issued free of charge through the NHS, at the request of the doctor undertaking the vaccination, only to those who are exposed in the course of their work to special risks of contracting rabies (for list of issuing laboratories see Appendix II).

Alerting Travellers Going Abroad

15. Mention has already been made of the risk to travellers going to enzootic areas and of the increased risk on the Continent as a result of the spread of the disease there. Travellers going to areas where rabies exists should avoid contact with animals and if they are scratched or bitten by an animal while abroad they should:

- (a) Wash the wound at once with soap or a detergent and apply 40–70% alcohol, or iodine;
- (b) seek medical advice at once: if post-exposure treatment is advised it should be started immediately;
- (c) where possible, exchange names and addresses with the owner or person in charge of the animal and arrange to be told if the animal sickens within two weeks; ask whether the animal has been vaccinated against rabies (and if possible find out when and where);
- (d) report the incident to the local police, particularly if the animal is a stray;
- (e) on return to this country consult their family doctor.

Pre-exposure vaccination is not recommended as a routine prophylactic measure for travellers going abroad, except in certain special circumstances such as persons going to work in remote enzootic areas where they may be at special risk—e.g. veterinary staff working in remote rural areas in developing countries.

Post-Exposure Treatment

16. Even when exposure to rabies does occur human cases and deaths can be prevented by prompt and appropriate post-exposure treatment. Paragraphs 16–19 should be read in conjunction with the WHO guidelines reproduced in full in Appendix III. The treatment of persons with a history of exposure, i.e. a bite, a scratch or an abrasion by an animal suspected or known to be suffering from rabies can be summarised as follows:

(A) Local treatment:

- (i) thorough cleansing of the wound
- (ii) instillation and infiltration of antirabies serum or immunoglobulin in and around the wound.

(B) Specific systemic treatment:

Combined serum-vaccine treatment or a modification of this in special situations.

(A) *Local treatment of the wound.* The wound should be thoroughly cleansed and irrigated with a 20% soap solution or with detergent such as those quaternary ammonium compounds which have a proven lethal effect on rabies virus, e.g. Cetrimide solution 0.1% BPC. Note that quaternary ammonium compounds are neutralised by tapwater in 'hard water' areas as well as by soap. If any wound is washed out with a soap solution it should be thoroughly rinsed with water before any application of quaternary ammonium compounds. Primary suture should be avoided. After suitable

sensitivity testing, antirabies serum should be infiltrated in and around the wound, using half of the total dose of antirabies serum recommended (see Appendix III). Patients who are sensitive to horses or horse serum should receive human rabies immunoglobulin instead of equine antirabies serum, again with half the dose being administered locally. Antibiotics and specific tetanus prophylaxis should be given if necessary.

(B) *Specific systemic treatment.* The aim of vaccine prophylaxis is to induce an antibody response as soon as possible, with good hope of preventing the clinical disease. The exact mode of action of the vaccine for this purpose is not known but there is evidence to show that the proportion of persons vaccinated after exposure who develop the disease is less than in those not so vaccinated⁽⁷⁾.

Rabies vaccine for post-exposure treatment

17. Three types of rabies vaccine are licensed for post-exposure treatment :

- (i) Human diploid cell vaccine
- (ii) Duck embryo vaccine
- (iii) Semple type rabbit brain vaccine

Human diploid cell vaccine

Human diploid cell rabies vaccine has now been licensed for post-exposure treatment. The vaccine has recently been used in controlled trials abroad and these have proved satisfactory. Information about this vaccine, including the recommended dosage schedule for post-exposure use, is shown in Appendix I. It is now the vaccine of choice.

Duck embryo vaccine

Duck embryo vaccine is given by subcutaneous injection in the dosage shown for post-exposure treatment in Appendix III. It carries less risk of neurological complications than the Semple type vaccine although the latter is more potent. The risk of neuroparalytic complications with duck embryo vaccine has been estimated at about 1 in 32,000 persons⁽⁸⁾.

Semple type rabbit brain vaccine

This is a nervous-tissue vaccine using virus completely inactivated by incubation at 37°C in the presence of phenol. Although more fully protective than duck embryo vaccine, the risk of neuroparalytic complications is higher : about 1 in 2,000 persons⁽⁹⁾.

Antirabies serum and human rabies immunoglobulin

18. Although vaccines do induce antibody formation in most recipients, there is a gap of days before any measurable antibody first appears. One report showed that no antibody appeared until the 10th day of a course of 14 daily injections of duck embryo vaccine⁽¹⁰⁾. Passive immunisation by injection of antirabies serum or immunoglobulin can help to fill the gap.

However, because of the immunosuppressive effect of passively administered antibody on active antibody production additional booster doses of vaccine are required. The WHO Expert Committee on Rabies (1973) considered that the combined administration of antirabies serum and vaccine together with local treatment of the wound, provided the best possible prophylaxis of rabies in an exposed person. They strongly recommended that this procedure be adopted in all cases of severe exposure and suggested that its use is justified in all genuine cases of exposure even of a mild nature. (See Appendix III.)

Guidelines and advice for post-exposure treatment

19. There is no set recommended schedule for post-exposure vaccination as the number and timing of injections depends on the circumstances of the individual patient. Detailed advice on the use of rabies vaccine, antiserum and immunoglobulin may be obtained from one of the laboratories of the Public Health Laboratory Service where stocks of these prophylactic agents are held (see Appendix II).

Where rabies is enzootic or where an outbreak of rabies occurs, post-exposure treatment is usually begun as soon as a person reports a bite by an animal suspected of having rabies. Even where the animal appears healthy and is kept under observation it would seem better to give at least one dose of rabies vaccine as a foundation for further treatment later if circumstances warrant it.

In the case of travellers returning to this country who report an exposure to an animal abroad it may often be advisable to start treatment while enquiries are made on the presence of rabies in the country concerned, and where possible, the health of the biting animal. In this connection the International Relations Division of the Department of Health and Social Security (Tel: 01-407 5522, Ext. 6711)* may be able to provide information on the existence of rabies in certain countries abroad and to assist in making enquiries of foreign health authorities regarding the health of an animal involved in an incident with a traveller from this country. Relevant particulars, such as the date of the incident, the location where the incident occurred, the species of animal involved and the name and address of the owner of the animal, are essential to enable the animal concerned to be identified and traced.

Two recent studies have shown that approximately 40 dog bites per month per 100,000 population are treated by general medical practitioners and in Accident and Emergency Departments of hospitals in this country^(11, 12). Although at the present time the possibility of contracting rabies from an animal bite in this country is very remote, those treating animal bites should bear in mind the need to enquire about the possibility of exposure to rabies. Before specific prophylaxis is recommended, a definite possibility of exposure to rabies should be established. An important factor would be the knowledge that the biting animal was in, or had recently been released from, quarantine or had been imported illegally. Where suspicion exists, the medical practitioner should contact the Medical Officer for Environmental Health who can obtain further information on the extent of the risk in the particular instance from

*In Wales, the Health & Social Works Dept., Welsh Office (Tel: Cardiff (0222) 44151).

the Divisional Veterinary Officer. If rabies should become enzootic in this country, practitioners treating casualties will become familiar with the appropriate course of action. Where post-exposure treatment is indicated this *should be started at once*. (See also paragraph 6.) Questions to ask the patient who has sustained an animal bite are suggested in Appendix VI.

Treatment of a Case of Human Rabies

20. If started early, the post-exposure treatment outlined above may be expected to prevent rabies but once clinical symptoms and signs of rabies appear treatment is usually of little avail. While the prognosis of rabies is undoubtedly grave, some hope has been raised by two reports of patients recovering from possible rabies. One report from the United States indicated that a six year old boy given a full course of vaccination following a bite from a rabid bat had developed, and fully recovered from, a rabies-like encephalitis. His antibody response far exceeded that which usually follows vaccination; it is thought his illness may indeed have been rabies and that active treatment to prevent complications may have contributed to his recovery⁽¹³⁾. The second report was from Argentina in 1976. A 45-year-old woman who had been severely bitten by a clinically rabid dog developed rabies 21 days later and subsequently recovered. The patient's rabies antibodies reached maximum titres of 1:640,000 and 1:160,000 and although she had received mouse brain antirabies vaccine after the dog bite, antibody titres of this magnitude have never previously been recorded with mouse brain antirabies vaccine and it is thought that this was a non-fatal case of rabies in man⁽¹⁴⁾.

The WHO Expert Committee on Rabies (1973)⁽¹⁾ recommended as follows:

"Although rabies encephalomyelitis in man has until recently almost inevitably ended fatally, it is the feeling of the Committee that modern means of treatment might provide some hope for recovery. A rabid patient should be isolated in an intensive medical care unit and treated along the following lines:

- (1) relieve anxiety and pain by liberal use of sedatives in a quiet environment,
- (2) ensure respiratory function by means of tracheotomy and artificial respiration,
- (3) if spastic muscular contractions are present, use drugs with a curare-like action,
- (4) ensure hydration and diuresis by intravenous perfusions and the administration of diuretics. Cardiac failure should be prevented by constant monitoring."

Although these recommendations have since been followed in a number of instances, no further case of recovery from clinical rabies has been reported and there is some evidence that the severity of the encephalitis is the ultimate barrier to survival⁽⁵⁾.

Suggested precautions

21. Rabies cases have traditionally been cared for without special precautions and infection of medical and nursing staff from a rabid patient has, as far as is known, not been reported. However, intensive medical and nursing care of the kind previously described prolongs the life of the patient and increases the chances of exposure to infection. Rabies virus may be present in the patient's saliva, tears, urine, CSF and tracheal aspirates for at least two weeks after the onset of symptoms. A possible risk therefore exists and the following precautions are suggested.

General

- (1) The patient should be strictly isolated in a single room;
- (2) staff in close attendance on the patient should be warned against possible contamination and should wear goggles, mask and rubber gloves;
- (3) staff with minor cuts or abrasions on their hands should not be allowed contact with the patient;
- (4) mouth to mouth resuscitation should not be used;
- (5) pregnant members of the staff should not attend the patient.

Clinical staff

- (6) Staff in attendance on a patient who is highly suspected of, or known to be suffering from, rabies should be offered vaccination. Four intradermal injections of 0.1 ml of human diploid cell vaccine given on the same day has been suggested for this purpose⁽¹⁵⁾.

Laboratory specimens

- (7) Specimens should be handled with the precautions appropriate to highly infective material. Whenever possible specimens should be handled in an exhaust protective cabinet. Centrifugation should be carried out in sealed buckets. Great care must be taken in the safe disposal of specimens and in sterilisation of any equipment used or areas potentially contaminated. (For general advice on the handling of specimens see *Safety in Pathology Laboratories*: Department of Health and Social Security, 1972.) Specimens for virological and antibody testing should be sent to the Central Public Health Laboratory, Colindale.

Ambulances

- (8) No special precautions are considered necessary except for numbers (1) to (5) above.

If in spite of these precautions a definite exposure to infection occurs such as a wound or abrasion caused by the patient, or contamination of mucosal surfaces by potentially infected secretions or excretions, then appropriate post-exposure treatment should be given (see paragraphs 16–19).

Disinfection

22. Objects soiled by infective secretions or excretions may be disinfected by boiling or autoclaving if appropriate. Where heat cannot be used, detergents, alcohol, or chemical disinfectants may be used (see Appendix IV).

Control Measures

Notification of a case of suspected or known human rabies

23. Rabies is a notifiable disease under the Public Health (Infectious Diseases) (Amendment) Regulations 1976. A Medical Officer for Environmental Health should ensure that all doctors in his district are aware that he should be informed immediately if a patient is suspected to be suffering from rabies.

Action to be taken by the Medical Officer for Environmental Health

24. The action to be taken upon receipt of notification of a case of human rabies will depend on the circumstances of infection of the patient concerned:

- (a) where the patient is known or suspected to have been exposed to infection by an animal abroad, action will generally be limited to offering, where appropriate, prophylactic vaccination to the patient's intimate home contacts and arranging for the disinfection of soiled articles contaminated by the patient before removal to hospital. At the same time the Medical Officer for Environmental Health should inform the Area Medical Officer of the area within which his district lies;
- (b) where the suspected source of infection is believed to be an animal in this country then, in addition to the action mentioned above at (a), the Medical Officer for Environmental Health should also ensure that the appropriate Divisional Veterinary Officer and the Communicable Diseases Section of the Department of Health and Social Security (Tel: 01-407 5522, Ext. 7340)* are informed of the circumstances of the case as a matter of urgency. Subsequent action as explained in paragraph 26 *et seq* may have to be taken if, following investigations by the Ministry of Agriculture, Fisheries and Food, it is decided to declare an area to be infected.

Report of an outbreak of animal rabies in this country

25. The Divisional Veterinary Officer concerned will inform the local Medical Officer for Environmental Health of all cases of suspect rabies in imported animals, farm livestock or wild life in the district.

Health control measures

26. The control of an outbreak of rabies involving animal cases and human contacts requires the concerted efforts of both animal and human health services working in close liaison. Medical Officers for Environmental Health will be aware of the contingency plans prepared by Local Authorities for the control of an outbreak and will work out details of local liaison with those concerned.

*In Wales, the Health and Social Works Dept., Welsh Office (Tel: Cardiff (0222) 44151).

On the human health side, control measures, which include the rapid epidemiological investigation and prophylactic vaccination where appropriate of contacts of known or suspected rabid animals, should also be closely co-ordinated.

The Medical Officer for Environmental Health should give individual consideration (in conjunction, where appropriate, with the family doctor or other clinician involved) to each person who might have been or could be exposed to infection, and offer vaccination against rabies (or ensure it is offered) to any person for whom he considers it is indicated. He should :

- (1) inform the Director of the Public Health Laboratory supplying anti-rabies vaccine and antisera as early as possible of the situation so that arrangements can be made to secure supplies, and
- (2) ensure at the same time that all general medical practitioners and Accident and Emergency/Casualty Departments in his district are told exactly what the situation is.

Where the suspected rabid animal is a domestic pet, terminal disinfection of the premises may be indicated. This would involve the washing of soft furnishings, carpets, clothing and other articles that may have been contaminated. Normal washing in detergent will destroy the virus.

Where a suspected or known rabid animal is found on a farm, attention will have to be given to the disposal of farm products from both suspect and contact animals. Milk from a dairy herd at risk should be pasteurised before consumption or use in manufacture.

The Medical Officer for Environmental Health may also be called upon, particularly where farm animals are involved, to advise officials of the Ministry of Agriculture, Fisheries and Food on the extent of human risk in allowing contact animals to remain in detention and isolation on farm premises. Persons who are likely to come into contact with such animals should be made aware of the potential hazards and should be offered pre-exposure prophylactic vaccination.

Post Mortem Examination

27. Rabies virus is classified by the Dangerous Pathogens Advisory Group as a Category 'A' pathogen. The Group has advised that where Category 'A' pathogens are in question, post mortem examinations should not be undertaken save in exceptional circumstances.

If however it is necessary to perform a post-mortem for confirmation of the diagnosis, reference should be made to the precautions outlined above (paragraph 21). If opportunity offers, consideration should be given to the planned use of pre-exposure vaccination for the pathologist and his assistant; and also to the accommodation available for conducting the post-mortem and subsequent sterilisation of the facilities used.

Disposal of Corpses

28. While the risk of infection from the body of a person who has died from rabies is probably slight it would nevertheless be prudent for attendants to wear protective clothing (see paragraph 21) and to avoid unnecessary handling of the body. Embalming should be discouraged, and where ritual washing of the body has to be undertaken, a quaternary ammonium compound, e.g. Cetrimide solution 0.1% BPC should, if possible, be used. Disposal is preferably by cremation.

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Notes on the Use of Human Diploid Cell Vaccine

Nature of the vaccine. This is a freeze-dried suspension of rabies virus prepared in human diploid cell cultures and inactivated by beta-propiolactone.

Reconstitution of the vaccine. The vaccine is issued by the manufacturers in single-dose vials accompanied by a disposable syringe containing 1.0 ml of diluent (distilled water). The vaccine should be reconstituted immediately before use. The entire amount of diluent is used and the resultant 1.0 ml of fluid represents one dose (but see reference (15) for the use of smaller doses intradermally).

PRE-EXPOSURE SCHEDULE FOR HUMAN DIPLOID CELL VACCINE

- (i) *Dosage schedule.* The recommended schedule for vaccination is as follows, the dose being 1.0 ml given intramuscularly:—*two doses given four weeks apart, followed by a reinforcing dose 12 months later, and additional reinforcing doses given every two–three years depending on the risk of exposure.*
- (ii) *Reactions.* Local: in less than 10% of the cases, redness and slight induration may occur at the site of the injection within 24–48 hours.
General: fever (about 38°C) may occur in 1% of cases within 24 hours. Neuroparalytic reactions have not been reported as yet.
- (iii) *Contra-indications.* No special contra-indications are known. The makers advise that the general contra-indications are those common to all types of vaccination.
- (iv) *Storage of vaccine.* The vaccine must be stored at 4°C for the expiry date to be effective.

POST EXPOSURE SCHEDULE FOR HUMAN DIPLOID CELL VACCINE

*1 ml of vaccine is given intramuscularly on day *0, 3, 7, 14, 30 and 90*

*Day 0 is the day when the patient receives the first dose.

Public Health Laboratories Holding Stocks of Rabies Vaccines and Antisera

1. The Central Public Health Laboratory, Colindale Avenue, LONDON NW9 5HT. (Tel No. 01-205 7041).
2. The Regional Public Health Laboratory, Fazakerley Hospital, Lower Lane, LIVERPOOL L9 7AL. (Tel No. 051-525 2323).
3. The Regional Public Health Laboratory, Institute of Pathology, Newcastle General Hospital, Westgate Road, NEWCASTLE UPON TYNE NE4 6BE. (Tel No. 0632-38811).
4. The Regional Public Health Laboratory, East Birmingham Hospital, Bordesley Green East, BIRMINGHAM B9 5ST. (Tel No. 021-772 4311, Ext. 4080).
5. Public Health Laboratory, Church Lane, Heavitree, EXETER EX2 5AD. (Tel No. 0392 77833).
6. The Regional Public Health Laboratory, Bridle Path, York Road, LEEDS LS15 7TR. (Tel No. 0532 645011).
7. The Regional Public Health Laboratory, University Hospital of Wales, Heath Park, CARDIFF CF4 4XW. (Tel No. 0222-755 954).

Guide for Post-exposure Treatment*

WHO Expert Committee on Rabies (1973)

The recommendations given here are intended only as a guide. It is recognized that in special situations modifications of the procedures laid down may be warranted. Such special situations include exposure of young children and other circumstances where a reliable history cannot be obtained, particularly in areas where rabies is known to be endemic, even though the animal is considered to be healthy at the time of exposure. Such cases justify immediate treatment, but of a modified nature, for example, local treatment of the wound as described below, followed by administration of a single dose of serum or three doses of vaccine daily; provided that the animal stays healthy for 10 days following exposure, no further vaccine need be given. Modification of the recommended procedures would also be indicated in a rabies-free area where animal bites are frequently encountered. In areas where rabies is endemic, adequate laboratory and field experience indicating no infection in the species involved may justify local health authorities in recommending no specific antirabies treatment.

Practice varies concerning the volume of vaccine per dose and the number of doses recommended in a given situation. In general, the equivalent of 2 ml of a 5% brain-tissue vaccine, or the dose recommended by the producer of a particular vaccine, should be given daily for 14 consecutive days. To ensure the production and maintenance of high levels of serum-neutralizing antibodies, booster doses should be given at 10, 20, and 90 days following the last daily dose of vaccine in *all* cases.

Combined serum-vaccine treatment is considered by the Committee as the *best* specific treatment available for the post-exposure prophylaxis of rabies in man. Experience indicates that vaccine alone is sufficient for minor exposures. Serum should be given in a single dose of 40 IU per kg of body weight for heterologous serum and 20 IU per kg of body weight for human antirabies immunoglobulin; the first dose of vaccine is inoculated at the same time as the serum but at another site. Sensitivity to heterologous serum must be determined before its administration.

Treatment should be started as early as possible after exposure but in no case should it be denied to exposed persons whatever time interval has elapsed.

In areas where antirabies serum is not available full vaccine therapy including three booster inoculations should be administered.

*It is strongly recommended that this guide be reproduced only in its entirety.

A. LOCAL TREATMENT OF WOUNDS INVOLVING POSSIBLE EXPOSURE TO RABIES

(1) Recommended in all exposures

(a) *First-aid treatment*

Since elimination of rabies virus at the site of infection by chemical or physical means (see section 9.2) is the most effective mechanism of protection, immediate washing and flushing with soap and water, detergent, or water alone is imperative (recommended procedure in all bite wounds including those unrelated to possible exposure to rabies). Then apply either 40-70% alcohol, tincture or aqueous solutions of iodine, or 0.1% quaternary ammonium compounds.*

(b) *Treatment by or under direction of a physician*

- (1) Treat as above (a) and then:
- (2) apply antirabies serum by careful instillation in the depth of the wound and by infiltration around the wound;
- (3) postpone suturing of wound; if suturing is necessary use antiserum locally as stated above;
- (4) where indicated, institute antitetanus procedures and administer antibiotics and drugs to control infections other than rabies.

*Where soap has been used to clean wounds, all traces of it should be removed before the application of quaternary ammonium compounds because soap neutralizes the activity of such compounds.

B. SPECIFIC SYSTEMIC TREATMENT

Nature of exposure	Status of biting animal irrespective of previous vaccination		Recommended treatment
	At time of exposure	During 10 days ^a	
I. Contact, but no lesions; indirect contact; no contact	Rabid	—	None
II. Licks of the skin; scratches or abrasions; minor bites (covered areas of arms, trunk, and legs)	(a) Suspected as rabid ^b	Healthy	Start vaccine. Stop treatment if animal remains healthy for 5 days ^{a, c}
	(b) Rabid; wild animal, ^d or animal unavailable for observation	Rabid	Start vaccine; administer serum upon positive diagnosis and complete the course of vaccine Serum + vaccine
III. Licks of mucosa; major bites (multiple or on face, head, finger, or neck)	Suspect ^b or rabid domestic or wild ^d animal, or animal unavailable for observation		Serum + vaccine. Stop treatment if animal remains healthy for 5 days ^{a, c}

^a Observation period in this chart applies only to dogs and cats.

^b All unprovoked bites in endemic areas should be considered suspect unless proved negative by laboratory examination (brain FA).

^c Or if its brain is found negative by FA examination (see 9.1).

^d In general, exposure to rodents and rabbits seldom, if ever, requires specific antirabies treatment.

Inactivation of Rabies Virus

The rabies virus is not particularly resistant and is readily inactivated by sunlight and heat.

In an article published in the Bulletin of the World Health Organisation M. M. Kaplan *et al.** described an intracerebral assay technique in mice for testing chemical disinfectants acting on the rabies virus. By this test, several substances usually available for the treatment of animal bite wounds were found to be effective. They were: 1%–2% soap solutions; 43%–70% alcohol; 1:1,000 (0.1%) or lower dilutions of two quaternary ammonium compounds, benzalkonium chloride and cetrimonium bromide; 1:1,000 or lower dilutions of iodine; acetone; and ether.

Several other substances tested for possible use in environmental disinfection were also found to be virucidal. They were: 3% caustic soda and commercial preparations of organic phenols, iodine, and a mixture of trisodium phosphate and sodium hypochlorite. No virucidal effect was exerted by a 2% aqueous solution of mercurochrome, a 1:1,000 aqueous solution of thiomersal or 3% formalin (1% formaldehyde).

*M. M. Kaplan, T. Wiktor and H. Koprowski (1966). Bulletin of the World Health Organisation, **34**, 293–297.

RABIES

Memorandum by the Ministry of Agriculture, Fisheries and Food and the Department of Agriculture and Fisheries for Scotland

(This memorandum revises and brings up-to-date the earlier one dated
26 July 1976).

PURPOSE

1. This memorandum describes the risk of rabies to Great Britain and outlines the Government's policy for dealing with it.

THE DISEASE

2. Rabies is a viral infection of the central nervous system for which there is no known cure and which is almost invariably fatal once clinical signs develop. It has been recorded in most warm-blooded animals, domesticated and wild, which become infected through contact with affected animals, usually carnivores. Man in turn has become exposed to the disease through contact with affected animals, both domestic and wild.

3. Transmission is mainly by the bite of an infected animal, but susceptibility is influenced not only by the quantity of virus thereby introduced but also by the site of the bite, the age of the receiver of the bite, and the properties of the virus strain involved. Of the common types of animals in Britain, the fox is the most likely vector in wild life, but most small wild animals, cats, dogs and farm animals can also be readily infected. Non-predatory animals such as cattle, sheep, pigs and horses rarely transmit the disease.

CLINICAL SIGNS

4. These appear as the virus becomes established in the brain. They can progress through three main stages:

- (a) *The prodromal stage*—the animal becomes irritable, anxious, uneasy, sensitive to noise and light and may bite the original wound site.
- (b) *Excitement stage*—irritability gives way to overt aggressiveness and fits. The animal attempts to bite objects and other animals; may want to break loose; the eyes take on a staring expression; there may be copious salivation; the lower jaw tends to sag; and there may be a change in voice.
- (c) *The paralytic stage*—a progressive paralysis of limbs and body sets in, causing staggering and respiratory distress; this is quickly followed by coma and death.

5. These stages may be of variable duration, so that the earlier symptoms may not be apparent, and an animal may only show the terminal stages of

the disease. The overall period from onset of clinical signs to death rarely exceeds 10 days. In the earlier stages a common factor is that the animal undergoes a change of temperament so that a normally friendly animal may become snappy and seek to avoid its owner's company, whereas timid, shy animals may become less restrained and unnaturally approachable. This is the common feature of wild animals, making them a particular hazard to children who, while delighting in their apparent "friendliness", become exposed to infection.

SITUATION ON THE CONTINENT

6. The annual rate of spread of rabies has varied from 20 to 40 km, but recent movement seems to be slower as the disease reaches the more heavily populated areas. There has been no marked advance of the disease towards the Channel coast during 1976. By the end of that year three cases (in foxes) had been reported 90 km from the coast in the Department of the Somme; otherwise the nearest point, where multiple cases had occurred, was 110 km inland near Beauvais in the Department of the Oise.

7. During 1976 there were about 2,900 confirmed cases of animal rabies in France, and 8,600 in Germany. This shows a significant rise compared with 1975 when the comparative figures were 2,000 and 5,700 respectively. In France the rise is believed to be caused by a second wave of cases in the already affected area rather than any acceleration of the movement south and west. In Germany the increase is thought to be due to restrictions imposed on wildlife control methods.

SITUATION IN THE BRITISH ISLES

8. There has been no case of rabies in animals, in or out of quarantine, since 1970.

THE THREAT

9. The Channel provides an effective barrier against rabies reaching the British Isles by wildlife. The introduction of the disease would be most likely through an illegally imported cat or dog which was incubating the disease. According to existing knowledge and experience, the introduction of the disease through any other species is not likely to involve a high risk of spread, but cannot be entirely discounted.

10. The threat, therefore, as it always has been, is through the illegally landed animal which may arrive by commercial or private transport from any part of the world where rabies occurs. The risk is greater during the summer holiday season due to increased traffic, particularly from the Continent.

GOVERNMENT POLICY

11. To counter that threat the Government have developed the following policy:

- (a) *The primary aim*: to keep rabies out of Great Britain by means of

stringent import controls, compulsory quarantine requirements, severe penalties for offenders and the active awareness and support of the public.

- (b) *The contingency aim*: should an outbreak nevertheless occur, to contain it and to stamp it out swiftly and effectively before it takes hold.

12. To achieve this policy the Government introduced the following legislation which became fully operative in February 1975:

- (a) Rabies Act 1974: enabling powers; penalties for offences etc. (The Criminal Law Bill, now before Parliament, seeks to increase the penalties for summary offences and to strengthen the police powers of arrest.)
- (b) The Rabies (Importation of Dogs, Cats and Other Mammals) Order 1974: import controls and quarantine requirements.
- (c) The Rabies (Control) Order 1974: measures to be brought into operation should an outbreak occur.

Since then two further measures have been introduced:

- (d) The Rabies (Compensation) Order 1976: compensation for animals compulsorily destroyed when dealing with any outbreak.
- (e) The Rabies (Importation of Dogs, Cats and Other Mammals) (Amendment) Order 1977: with effect from 28 March 1977, to tighten the import controls in the 1974 Order and to facilitate their enforcement.

The powers available under this legislation are described more fully in paragraphs 15-23 and 43-49 below.

ALLOCATION OF RESPONSIBILITIES

13. The execution of the Government's policy demands the concerted effort of many Government Departments as well as local authorities, port health authorities and the police. In Great Britain the central responsibility for the campaign against rabies in animals of all kinds rests with the Ministry of Agriculture, Fisheries and Food and the Department of Agriculture and Fisheries for Scotland, though if there were an outbreak operational control would rest entirely with the former. Other Government Departments with an interest are:

Customs and Excise	—enforcement of import controls at the ports and airports
Department of Health and Social Security	—rabies in humans; prophylactic and post-exposure vaccinations
Department of the Environment	—nature conservation; local authority implications
Home Office	—cruelty against domestic and captive animals; police implications; penalties
Scottish Office	—the special interests of Scotland
Welsh Office	—the special interests of Wales.

BRITISH ISLES CO-ORDINATION

14. The Government also keep in close contact with the appropriate authorities in Northern Ireland, the Republic of Ireland, the Channel Islands and the Isle of Man to ensure compatibility of legislation and regulations and to co-ordinate defences with the collective aim of keeping rabies out of the British Isles.

RABIES (IMPORTATION OF DOGS, CATS AND OTHER MAMMALS) ORDER 1974 AS AMENDED BY THE 1977 ORDER

15. The main principles of this Order (importation control and quarantine for rabies-susceptible animals) accord with the advice of the World Health Organisation for rabies-free countries, especially those with no land borders adjoining countries where rabies exists.

16. The Order covers all warm-blooded mammals except farm stock and some other herbivores which are not considered significant vectors of the disease. These exceptions are subject to controls under the Order if they have been in contact with species subject to quarantine regulations; however, they are also subject to other animal health import controls which provide safeguards against rabies.

17. The main provisions of the Order are:

- (1) The landing in Great Britain of an animal brought from outside Great Britain is prohibited except in accordance with the terms of a licence issued in advance (Article 4 (1) and (3)).
- (2) The prohibition does not apply to animals brought from Northern Ireland, the Republic of Ireland, the Channel Islands or the Isle of Man, unless the animals had been brought to those countries from elsewhere and had not undergone at least six months' quarantine before being landed in Great Britain (Article 4 (2)).
- (3) Licensed landings are permitted only at ports and airports authorised in Schedule 2 (as amended) to the Order unless the vessel or aircraft has been diverted in the interest of safety, or in other exceptional circumstances (Article 4 (5)).
- (4) An animal taken to a place outside the British Isles and brought back, whether or not it landed in that place, or an animal which, while outside Great Britain, has had contact with an animal to which importation controls apply, is an imported animal for the purposes of the Order (Article 4 (8) (a) and (b)).
- (5) Animals imported under licence must be detained in quarantine for six months (life in the case of vampire bats), at the owner's expense (Articles 5 (1)-(4)). Quarantine may be extended in the case of a rabies outbreak at quarantine premises (Article 5 (5)).
- (6) Vaccination against rabies of dogs and cats in quarantine is compulsory (Article 6 (1)), with exemption provision where the dog or cat has been imported for research purposes with which vaccination might interfere (Article 6 (2)).

- (7) Animals imported in accordance with a licence must be removed to quarantine premises by an authorised carrying agent (Article 7).
- (8) An animal passing through Great Britain must remain within the confines of the port or airport while awaiting transshipment, and may only be moved within the port or airport by an authorised carrying agent. It must be exported from the port or airport within 48 hours, and if remaining there for more than four hours it must be retained in authorised holding premises until re-embarkation (Article 8).
- (9) Animals from abroad on board vessels in harbour in Great Britain must be restrained and securely confined in a totally enclosed part of the vessel, prevented from contacting any other animals, and in no circumstances permitted to land (except in accordance with an importation licence) (Article 12).
- (10) Native British animals are prohibited from boarding vessels on which there are animals from abroad, with exemption provision for police, Customs, etc., dogs under control of handlers and for animals for export (Article 12).
- (11) Animals in relation to which there are contraventions of, or failures to comply with, provisions of the Order may be seized and, if appropriate, destroyed by an inspector or a constable (Articles 12, 13 and 14).

ENFORCEMENT PROCEDURES AND ADDITIONAL REGULATIONS

18. Local authorities are the enforcement authorities, through their diseases of animals inspectors. The police, and Ministry inspectors appointed under the Diseases of Animals Act 1950, also have enforcement powers.

19. The first line of defence is normal Customs surveillance. All port and airport officials have a duty to be vigilant against illegal landings. Appropriate leaflets have been issued to all Customs and other officials concerned.

20. Shipping and airline companies are required to ensure that animals are not embarked without a boarding document showing that an import licence has been granted. Airlines are also required to ensure that animals do not travel other than as 'manifested' freight in an approved container in the freight compartment, and that containers are properly labelled with an official 'animal in quarantine' label.

21. All authorised ports of entry are required to provide approved secure holding facilities for the temporary retention of transshipment animals and imported animals whose transport to approved quarantine premises is, for any reason, delayed. The capacity of each holding facility is required to be adequate to meet the throughput.

PENALTIES AND PROSECUTIONS

22. Offences under the Rabies (Importation of Dogs, Cats and Other Mammals) Order 1974 can be dealt with either under summary proceedings,

where the maximum penalty is a fine of £400 (but see paragraph 23 below), or (where there is evidence of deliberate intent to evade the provisions) on indictment, in which case the maximum penalty is an unlimited fine and/or up to one year's imprisonment. In addition, the animal may be destroyed at the discretion of the enforcing authority, though this is not intended to be a punitive measure.

23. The Criminal Law Bill, now before Parliament, seeks, amongst other things, to increase the existing maximum fine of £400 available to magistrates' courts to £1,000. It also seeks to give to the police powers of arrest without warrant in respect of offences or suspected offences against the antirabies import controls, and powers to enter and search vessels, vehicles etc. for the purpose of making such arrests and for the purpose of seizing animals under the powers conferred by the Import Control Order.

24. In 1975 there were 52 prosecutions in Great Britain, including one on indictment which resulted in a fine of £200 plus £200 costs and a sentence of six months' imprisonment, suspended for a year. The average fine was £175 compared with £50 in previous years.

25. In 1976 there were 125 prosecutions in Great Britain, involving 110 offenders, of whom 88 were foreign nationals. Dogs or cats were involved in 111 of the cases and other mammals in the remaining 14. Thirty-four prosecutions were for failure to confine animals properly on board vessels; the remainder involved illegal landing offences. Five offenders received prison sentences (two of four months, two of three months and one of six months suspended for a year). Fines ranged from £20 to £400 in magistrates' courts and up to £1,000 in the Crown Court. The average of all fines was £214; and 18 offenders were given the alternative of imprisonment if fines were not paid.

26. The statistics given in paragraphs 24 and 25 clearly demonstrate that, since the 1974 Order became operative, the courts have taken a more serious view of anti-rabies offences. In many cases the maximum fine (plus costs) has been imposed.

ILLEGAL LANDINGS

27. During 1975 there were 3,758 dogs and 1,215 cats imported under licence. In the same period 143 dogs and 38 cats were known to be illegally landed; also 561 other mammals (many of which were in batches). A large proportion of these illegal landings were technical offences where prosecution was considered to be inappropriate and where the animals could be placed within the proper quarantine conditions. The 1975 figures show a significant reduction compared with those for 1974, except for dogs.

28. In 1976, 4,258 dogs and 1,595 cats were imported under licence. During the same period 118 dogs, 45 cats and 138 other mammals (in 42 batches) were illegally landed. In view of the number of successful prosecutions during that year (see paragraph 25 above), the indications are that

fewer technical offences are occurring, that a higher proportion of offences meriting prosecution are being detected, and that the enforcing authorities are showing their readiness to prosecute wherever appropriate. This reflects the increased effectiveness of the strict import controls and the determination of all concerned, with the support and co-operation of the public, to enforce them.

SMALL BOATS AND YACHTS

29. The volume of small boat traffic from abroad is not great compared with passenger ferries, but Customs and harbour-masters keep a keen surveillance over it. The owner or captain of a vessel is required to sign a Customs declaration form on arrival and is informed of his obligations concerning the proper confinement of animals on board while in port in Great Britain.

30. Posters emphasising the danger from illegally landed animals and the penalties for contraventions are on display in small harbours and coastal marinas. Local and health authorities and harbour-masters maintain close contact with local yacht clubs and small boat owners, and have repeatedly warned them about taking animals across the Channel. Special publicity is arranged through the yachting associations to remind boat-owners that animals taken abroad, whether or not they have landed, are subject to import controls and quarantine on return to this country. In addition posters have been, and continue to be, distributed through the British Embassies in France, Belgium, Holland, Luxembourg, Germany, Italy, Spain and Portugal to publicise the regulations, particularly through yachting and similar associations. These are being supplemented in 1977 by leaflets and posters for display on yachts.

31. Although recognised ports and harbours are covered, HM Customs can never hope to have sufficient staff available to keep constant watch over every point on the coast where yachts can berth. It would clearly be unrealistic to attempt such comprehensive surveillance. This is admittedly an area which presents some risk, but that risk is offset by the country-wide vigilance of the police and the local authorities, with the co-operation and assistance of the Royal Yachting Association, the National Yacht Harbours Association and similar bodies. The greater public awareness and concern now being shown should also help to guard against illegal landings.

32. Large, all weather notice-boards are provided by the Agriculture Departments for use at harbours and ports throughout the country. These state in appropriate languages that the landing of animals is prohibited. The written message is reinforced by a pictorial one.

COMMERCIAL VESSELS (INCLUDING CROSS-CHANNEL FERRIES)

33. In addition to the measures described in paragraphs 29-32 above, shipping companies are not permitted to accept animals for landing in Britain,

except through authorised ports of entry and on production of a boarding pass which shows that an import licence has been issued. Like airlines, the shipping companies are liable to prosecution should an animal be landed illegally from their vessels; and they are most vigilant to prevent such landings. Large, all weather notice-boards are also being provided at the Continental departure points of cross-Channel ferries.

OIL RIGS

34. The Rabies ((Importation of Dogs, Cats and Other Mammals) Order 1974 regulates the landing of rabies-susceptible animals from any place outside Great Britain, including oil rigs. Animals landed from these structures are subject to the normal six months' quarantine requirement, whether or not they come from outside territorial waters or have had contact with 'foreign' animals. HM Customs and the relevant port authorities are well aware of the situation and appropriate enforcement measures are taken at those ports used by vessels which service oil rigs. There is no evidence to suggest that oil rigs and like structures present a loop-hole in the antirabies defences.

QUARANTINE

35. The Committee of Inquiry on Rabies (the Waterhouse Committee), which reported in June 1971, made a number of recommendations concerning quarantine kennel standards. Most of these more stringent requirements have been put in effect since September 1972 or earlier. Any extensions to existing or new premises have had to meet full Waterhouse standards since that time. Only one recommendation, concerning individual exercise runs, has not yet been fully implemented, as major reconstruction was needed in some kennels. A seven-year transitional period, terminating in September 1979, has been allowed to carry out this work.

36. All quarantine premises are regularly inspected by the Veterinary Service to ensure that satisfactory security and welfare standards are maintained.

PUBLICITY

37. The Government regard the active support of the public as an important part of the defences against rabies. It is also important to reduce the rabies risk at its source abroad: this can only be achieved by publicity measures.

38. The 1976 Rabies Awareness Campaign was more intensive than the 1975 publicity. Posters and leaflets were displayed and distributed widely through local authorities, travel agents and other appropriate organisations and associations. Leaflets were also distributed to travellers passing through Channel ports. Articles were provided for many travel and similar publications. In co-operation with the COI, new posters and leaflets were designed

for wide distribution at home and, with the help of British Embassies, to suitable places and organisations (sport and yachting associations, etc.) in most European countries and elsewhere in the world. Two short TV films were shown during the spring and summer of 1976; and the COI produced a TV programme for showing on the Continent and elsewhere abroad. Comprehensive information on British regulations was also available at all Embassies and Consulates abroad. Numerous Ministry sponsored or supported rabies presentations and exhibits took place regularly throughout Britain.

39. A research programme into the effects of the 1976 campaign confirmed that it had achieved a high level of awareness, and indicated areas in which additional effort could be most effective. This programme represents a part of the continuous effort to identify and to fill any gaps in publicity coverage.

40. The Rabies Awareness Campaign 1977, launched on 23 March, will maintain and build on the level of awareness achieved during 1976. Much of the existing material will continue in use, supplemented by new material based on experience and the conclusions of the publicity research programme. Greater efforts will be made to publicise British regulations abroad.

41. A new short TV film has already been shown at home during 1977, and two more are planned during the summer of that year. Radio items and rabies exhibits and presentations will be continued. Leaflets will continue to be distributed widely; they will be available in many foreign languages for distribution through Embassies, foreign banks, travel agencies, tourist and yacht clubs etc. A third poster will be added to the home selection. Special foreign language posters have been designed for display by British caravans and yachts travelling abroad. The COI are planning a further TV item to follow up the wide success of their 1976 programme. There are also the large permanent all-weather notices referred to in paragraphs 32 and 33 above.

FURTHER MEASURES FOR IMPROVING IMPORT CONTROL

42. The Agriculture Departments are constantly searching for practical means of further strengthening the antirabies defences within the resources available. They are in close touch with local authorities and other appropriate bodies who are dealing with the problem on the ground.

CONTINGENCY PLANS UNDER THE RABIES (CONTROL) ORDER 1974

43. The Rabies (Control) Order 1974 provides far-ranging powers to deal with any outbreak. Which of those powers would be used would depend on the circumstances, including the nature and location of the outbreak. At one extreme there could be a situation where an infected domestic pet had had no contact with other animals; in this case limited measures might easily contain the disease. At the other extreme, there could be an area containing infected wildlife, farm stock and domestic pets, where the problem of containment would be complex.

44. As soon as there were reasonable grounds to suspect that an animal might be infected with rabies, the premises on which it was kept would be declared an infected place. The suspect animal and any contacts would be required to be securely confined within the premises or, in the case of a high-risk suspect, it would be removed for detention and observation to secure accommodation maintained by the Agriculture Departments for this purpose. If the suspect is rabid, it will die within a few days; the brain can then be tested for rabies at the Ministry's Central Veterinary Laboratory. Alternatively, if the circumstances point to the desirability of immediate slaughter and a rabies test, there is power to do this. Suspect rabies cases are investigated as part of normal animal disease control, but none has proved positive since 1970. Dealing with suspects helps to keep all concerned on the alert and prepared for the real thing, should it occur. It is essential to have an effective procedure for dealing with suspects, because action at that stage lays the foundation for necessary follow-up action should the diagnosis prove positive.

45. This follow-up action would depend on the circumstances. The critical factor would be whether or not the infected animal had been at large with the opportunity of infecting other animals, including wildlife. If this were the case, the next step would be to declare an infected area; the size would depend on the circumstances. This would enable any or all of the following measures to be put into effect:

- (1) restriction of movement of animals into and out of the area;
- (2) control and confinement of animals in the area (e.g. muzzling and leashing of dogs and leashing of cats);
- (3) seizure, detention and disposal of animals not under proper control in the area;
- (4) compulsory vaccination of animals;
- (5) prohibition of gatherings of animals and sporting and recreational activities, including hunting, the racing or coursing of hounds or dogs, point-to-point meetings and the shooting of game or other wildlife;
- (6) the destruction of foxes, which are the main wildlife vector of the disease on the continent of Europe.

46. In the event of a rabies outbreak in wildlife anywhere in Great Britain, control measures would concentrate on the destruction of foxes in the infected area. The methods employed would be those calculated to be most effective to suit the local circumstances, while presenting the minimum hazard to other species of wildlife and to farm and domestic animals.

47. In most kinds of outbreak that could occur the co-operation and assistance of many Government, local authority and other interests, including practising veterinary surgeons, would be needed. To this end extensive consultations have been held with all concerned; and guidelines have been issued to enable local authorities and the police to prepare their own local plans.

48. Although detailed planning, including the provision of equipment, is a continuing process, the country should now be in a position to counter an outbreak effectively.

49. A programme of purchasing necessary equipment to hold in readiness for a rabies outbreak is continuing. Many items are already available and some are used for dealing with suspects that are reported from time to time.

VACCINATION OF DOMESTIC ANIMALS

50. Vaccination of animals is not allowed in Great Britain, except for animals being exported to countries where regulations require it and for dogs and cats in quarantine, where it is mandatory in order to provide an additional safeguard against the unlikely possibility of accidental cross-infection. So long as the country remains free of rabies the Government do not propose to permit its use.

51. Although vaccines have improved there is no known vaccine which can guarantee complete immunity against rabies. Much depends on the individual animal's health status, differences in quality of the types of vaccine available, the varied response of individual animals to the vaccine, and on the route of challenge and the amount of rabies virus absorbed should the animal subsequently be bitten by an affected animal. To permit the vaccination of 'native' animals in a rabies-free country would be wasteful without providing a real safeguard; it could undermine confidence in and support for the Government's proven policy of import control and quarantine, and create a sense of false security which might induce some pet owners to smuggle, who otherwise would not.

52. The World Health Organisation recommends a policy of import control and quarantine for rabies-free countries (WHO Expert Committee on Rabies: Sixth Report—Geneva, 1973). The success of this policy in Great Britain can best be judged by the fact that in over 50 years only two cases of rabies have occurred outside quarantine, although 27 animals have died from the disease in quarantine over the same period. Both these 'out of quarantine' cases were in imported dogs which had completed their six months' quarantine (for details see Report of the Committee of Inquiry on Rabies, HMSO Cmnd 4696, June 1971). In addition, a rhesus monkey imported for medical research in November 1965 died in January 1966 from rabies. At that time primates were not covered by the rabies quarantine legislation.

53. There are on record many cases of rabies which have occurred in spite of vaccination. In this country, a dog which died of rabies in June 1968, while in quarantine, had been vaccinated twice in the country of origin in 1967; the only domestic cat to die of rabies in quarantine since 1922 had been vaccinated; and in the last case of rabies in this country in 1970 (out of quarantine) the affected dog had been vaccinated on three occasions before importation.

54. In the event of compulsory vaccination of dogs and cats or other prescribed species becoming desirable as a control measure in an infected

area, Government contingency plans exist for carrying out such a programme quickly and comprehensively. These plans include provision of sufficient approved vaccine, syringes, etc. within the necessary time-scale, as well as the organisation of vaccination centres, the plans for which were formulated jointly with the British Veterinary Association. The cost of vaccination in an infected area would essentially be borne by the Government.

VACCINATION OF WILDLIFE

55. Limited experiments have been carried out on the Continent on the oral vaccination of wild foxes. This requires the use of live vaccine, which is not acceptable in this country because of the possibility of excretion of the vaccinal virus in the saliva of the animal, which might present a health hazard to animals and man. Furthermore, the dosage required and the duration of immunity provided by oral vaccines are largely unknown. Research continues on the Continent and Ministry experts keep in close touch with developments. However, it is unlikely in the foreseeable future to prove acceptable or effective in dealing with the likely type of wildlife rabies outbreak in this country. Government policy is to stamp out any outbreak before the disease becomes established.

HUMAN VACCINATION

56. Prophylactic vaccination is available to people exposed in the course of their work to special risks of contracting the disease, such as persons employed at quarantine kennels, at quarantine premises in zoos and other establishments, and at ports with regular traffic in imported animals. Stocks of vaccines, antisera and immunoglobulin for post-exposure treatment are available at selected public health laboratories for the treatment of returning travellers who may have been exposed to rabies infection while abroad, and to meet any likely emergency in this country.

57. There has been a great deal of research in recent years in many parts of the world, and considerable improvements have been made in protection against rabies, especially in the development of new and more effective types of vaccine.

25 April 1977

QUESTIONS TO ASK THE PATIENT

APPENDIX VI

Any person giving advice on rabies will need to know the answers to these questions before advising on the correct schedule of treatment for a patient who has suffered an animal bite:—

1. Was the person bitten or licked on an open wound or mucous membranes by an animal?	Yes/No
2. What species was the animal?	
3. Where did the incident take place and on what date?	
4. Was the animal (a) behaving normally at the time? (b) had it been vaccinated?	(a) Yes/No (b) Yes/No
5. Is rabies known or suspected to be present (a) in the species? (b) in the area?	(a) Yes/No / Don't know (b) Yes/No / Don't know
6. Is the animal being held under observation?	Yes/No
7. Did the animal become ill while under observation for the next 10 days?	Yes/No
8. Does laboratory examination of the animal's brain confirm rabies?	Yes/No

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